Advanced Study Strategies

Sometimes just reading over your notes for the 4th time just doesn't do the trick! Here is a list of some study strategies that you can use to improve your studying. They are broken up into three categories: material review techniques help you find gaps in your knowledge, adapting your study strategies help you recognize how to use your time more effectively, and pre/post class checks help you get the most out of your lectures. This list is not exhaustive, so feel free to get creative with them!

The underlying purpose of all these techniques is to get you to self-reflect on how your learning is going and identify where you need to improve. This is a well-used technique in education and is called “Metacognition”.

Material Review Techniques

Concept Mapping
Take a pile of small post-it notes and write a key-word from the course on each one. On a large sheet of paper arrange the post-its by grouping like concepts together. Draw arrows between concepts to show their relationships. Concept maps are great at helping you see the “big picture” of the course which will help both your understanding and memory of the content. Anywhere where you are uncertain what to write on a connecting arrow between concepts indicates a gap in your knowledge.

Student-Generated Test Questions
As an exam-prep strategy, try pretending to be the professor and make up your own exam questions. Going through your notes looking for “testable” material is a great way to study because (1) it gets you to think critically about the material and (2) it helps you focus on the material which is more likely to be on the exam.

WTF?
Read through your notes marking a WTF or a ? in the margin every time something is not clear. This helps you focus your time on the things that you don't know as well.

Adapting Your Study Strategies

Learning Inventory
Record the amount of time spent on each kind of study task; reading notes, reading slides, flashcards, group study, etc. By making this list you may see a more efficient way to spend your time.

List your lifelines
Write down or share with a friend what resources you have available to you. The point is to recognize that you are not alone in the learning process and have lots of places to go when you get stuck. The earlier in the semester you do this, the better. (TA/Prof office hours, online discussion boards, classmates/friends, tutoring services, etc)

Study Strategy Brainstorm
With friends brainstorm the different strategies you use while studying. Which ones are more or less effective in which situations? Listing them out loud allows you to take conscious control of your study habits, plus your friends may have some good ideas that you've never thought of!

Will I meet my goals?
List your goals for this course, either short term (test tomorrow) or long term (course project). Be honest with yourself about your current progress towards your goals. If you think you won't make it, then what can you change?
Your greatest success

Think of a moment of high academic stress that you successfully overcame. How did you do it? What can you adapt from that success to your current situation?

Pre / Post Class Checks

Ask yourself

Ask yourself a series of questions before starting a new topic in lecture.
Questions of the type: What do I already know about this topic? What do you think will be the hardest part?
Return to the questions at the end of a lecture or a unit for re-evaluation.

Before and after paired questioning

Each student writes a question they have about the topic to be covered (or that has been covered) that class and use it to quiz a neighbour. Can be done before and/or after a class.

Directed Paraphrasing

Paraphrase part of the course material, aiming it at a specific audience. For example you might try to explain Cellular Respiration to an audience of economics majors. By re-phrasing the material for a different audience you have to think critically about the material, you will quickly realize what you do and don't understand.

Minute Paper

An amazing quick little activity that can be used everywhere! During lecture, at the end while everyone's packing up, or while studying your notes! Take 60 seconds to write a one-sentence essay summarizing the main point of what you just heard / read.

Muddiest Point

A specific form of Minute Paper - jot down the single point from the lecture / chapter / page of notes / etc that you feel was least clear. Identifying the gaps in your knowledge is the first step to fixing them!

One-Sentence Summary

A specific form of Minute Paper - quickly summarize anything from a single concept up to an entire lecture in a single sentence. This forces students to be creativity in order to summarize a large amount of information concisely and completely.
<table>
<thead>
<tr>
<th><strong>The Cornell Method</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Page #</strong></td>
</tr>
<tr>
<td><strong>Layout of the page and where to write</strong></td>
</tr>
<tr>
<td><strong>Organization of concepts</strong></td>
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<tr>
<td><strong>Filling in blanks.</strong></td>
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<tr>
<td><strong>Reviewing and Studying</strong></td>
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<tr>
<td><strong>Advantages</strong></td>
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</tbody>
</table>
Advanced Learning Workshop

Mike Ounsworth, Laura Chouinard-Thuly, Vincent Cutillas, Mercedes Garcia Holguera

Oct. 2014 - McGill University
Learning Objectives

During this presentation you should:

• Develop tricks to be a more effective learner, specifically:
  - Develop a more effective note taking method
  - Understand the value of peer instruction and study groups
  - Understand how emotions and stress effect learning
  - Develop tricks to monitor your own learning
Taking Notes Effectively

Good or bad notes?
Taking Notes Effectively

Phys. 210, Ex 4, S51, P 4-21

Friction: So far, we’ve neglected friction to keep our life simple, but to try to understand the underlying laws of nature (Newton’s laws). Now that we’ve got these laws, there’s no reason to always neglect friction. It’s real, omnipresent. (It’s very well described as present, but is surprisingly poorly understood at a microscopic level... still a research topic!)

If an object slides on a surface, it always experiences some “Kinetic” friction (moving friction). This frictional force, $F_r$, always opposes the motion.

For $\vec{F}_r$ is always away. Careful though, velocity is a vector, but it is not a force, neither doesn’t belong in the force diagram, or at least should be clearly separated so avoid confusing it for a force!

Here’s a surprise. If similar objects, as shown, moving right, feel the same frictional force, you might have thought friction <area>, but it’s not. (More area means the weight gets more spread out, less friction/area)
Taking Notes Effectively

Good or bad notes?
Taking Notes Effectively

Good or bad notes?
Taking Notes Effectively

Good notes...

✧ Are understandable!
✧ Summarize and organize content
✧ Highlight important material
✧ Help to study later

From sciencenotebooks.org
Taking Notes: General Tips

Pick the 10% that matters most!

Average rate of speech:
2 - 3 words / second

Average handwriting:
0.2 – 0.3 words / second

(Olive & Kellogg, 2005)
Taking Notes: General Tips

Use shorthand!

“The English language is full of filler words.”

“English full of filler”

Psst: Fill your sentences later!
Taking Notes: Cornell Method

During class:
1. Use bullets!
   • And indents
2. Underline important words
3. Skip lines with subject change
4. Skip line if unable to follow instructor (fill later)

End of class:
Write cue/summary words

Same evening or morning:
Day/page summary
### Tips for notes

<table>
<thead>
<tr>
<th>Why we take notes</th>
<th>The Cornell method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADVANCED LEARNING TECHNIQUES 10/14/2014</td>
</tr>
</tbody>
</table>

#### Note taking

- Tips for note taking:
  - Use indents
  - Use **BOLD**

- Notes:
  - To summarize
  - To organise
  - To help learn
  - To revise

The **Cornell** method:

- Place for cue word
- Place for inclass notes
- Place for day and page summaries

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Today we looked at how to take efficient notes, that will help revise and help memory about the content seen during the class. These notes should be clear and understandable, and ideally show how the content is organised. The left margin is for cues words, while the bottom part is for summaries! Happy studying!

http://www.ehow.com/how_8220879_do-cornell-notes-microsoft-word.html
Activity:

Let’s give it a try during this lecture...

Take a moment to set up a new page for the Cornell Method.
Older Siblings are Teachers from a young age!

(Bargh & Schul, 1980)
We Learn more when we Teach!

Participants were asked to read a passage with the intention either to answer a test, or to teach another person.

In the end everyone was given the same test.

(Bargh & Schul, 1980)
We now have a term for this:
We now have a term for this:

• Since 1978 the psychology of peer instruction has been well studied.
• More on this in a few minutes ...
Classroom Learning: Case Study

- Calculus at UC Berkeley, 1978

Results:

- Individual Assignments -> Instructor A
- Group Assignments -> Instructor B

Bar charts showing:
- Percentage of students achieving grades of \( \geq B+ \) and \( \leq D \)
- Dropout rate
Bloom’s Hierarchy
(Levels of Thinking)

Activity:

• Organize yourselves into groups of approx. 4 people.

• Each group will be given a word, try to come up with a definition for this word in the context of teaching the learning.
Bloom’s Hierarchy
(Levels of Thinking)

Remember – “Storing and retrieving factual information.”

Understand – “Building connections between factual concepts.”

Apply – “Carrying out or using a procedure in a given situation.”

Analyze – “Breaking material into its constituent parts.”

Evaluate – “Assigning value to a concept based upon criteria and standards.”

Create – “Combining previous knowledge to form something new.”

(Krathwohl, 2002), (McKeachie & Svinicki, 2011)
Bloom's Hierarchy (Levels of Thinking)

(Bloom, 1956; Krathwohl, 2002)
… back to Peer Instruction
One reason that peer instruction is so powerful is that teaching is a complex task; it requires you to analyze the concept you are trying to explain in order to create and evaluate different ways of explaining it.
Getting the most out of your brain
Neuroscience

• Exercise

Composite of 20 student brains taking the same test

After sitting quietly  
After 20 minute walk

Research/Scan compliments of Dr. Chuck Hillman University of Illinois

On that note ... let's do some stretches!
Neuroscience

- Attention Span

~15 min - adolescents
~20 min - adults

(McKeachie & Svinicki, 2011)
Neuroscience

- Attention Span

  ~15 min – adolescents
  ~20 min - adults

  (McKeachie & Svinicki, 2011)
Neuroscience: Tricks

Tricks for waking up from your 20 min slump

Physical:

• Stretching and breathing exercises.
• Drink some water

(Jensen, 2011)
Neuroscience: Tricks

Tricks for waking up from your 20 min slump

Mental:

• On a side sheet, quickly summarize the main points of the last 20 minutes.

• Spatial reasoning: picture what the podium would look like upside-down.

(Jensen, 2011)
• The Forgetting Curve And Interval Learning
A Little Activity

In silence...

Read the instructions on your sheet very carefully and please do not discuss it out loud.
A Little Activity
A Little Activity

Positive emotions help memory!

- Deep Task
- Intention to recall

- Shallow Task
- No intention to recall

- Deep Task
- No intention to recall

- Shallow Task
- Intention to recall
A Little Activity

There is a role for emotions in the classroom!

Deep tasks:

• “How do I feel about this?”
• “This reminds me of the time when…”
• “This is similar to…”
Neuroscience: Emotions

But stress inhibits learning...

(“Understanding the stress response” – Harvard Medical, 2011)
Neuroscience: Emotions

No long-term memory formation

Long-term memory formation!
Don’t study stressed!
• If you feel stressed, take 30 – 45 minutes to relax before you start studying.
• This “wasted” time will pay itself off in the long run!
Metacognition

Taking control of your learning habits
Metacognition

Example: sleep or coffee?

Activity:

• Think about yourself and which of those strategies (sleep or coffee) would work better for you.

• Write down some factors about yourself that influenced this decision.
Metacognition

Definition: Analyzing your study habits and making changes where necessary.

Monitoring Your Learning  -->  Metacognition  -->  Adapting Your Strategies
Strategies for Adapting

Activity:

• Read through the strategies in the handout and pick one that you find interesting.
Take 5 minutes to go over your notes from this presentation.

- Summarize the main points with keywords in the Cue Column.
- Fill out any incomplete ideas.
Develop a personalized note-taking method, we suggest the Cornell Method as a base.

Find the Bloom’s Level of Thinking your instructor is asking for, and study accordingly.

Be aware of your 20 minute attention span.

Relating to content emotionally is good,

But stress is bad